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## Effects of the level of physical activity on physical education state anxiety among college students

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EFFECTS OF THE LEVEL OF PHYSICAL ACTIVITY ON PHYSICAL  
EDUCATION STATE ANXIETY AMONG COLLEGE STUDENTS

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A Thesis  
Presented to the  
Faculty of  
California State University,  
San Bernardino

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts  
in  
Education:  
Kinesiology

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by  
Minhyun Kim  
June 2012

EFFECTS OF THE LEVEL OF PHYSICAL ACTIVITY ON PHYSICAL  
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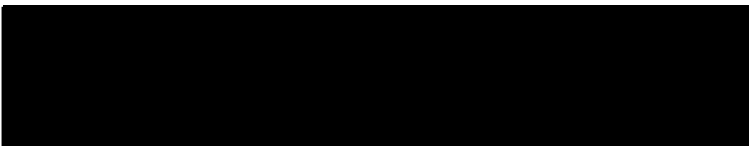
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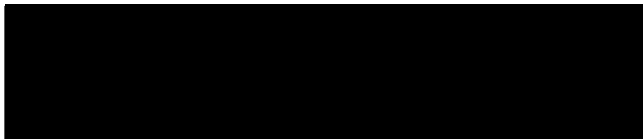
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by  
Minhyun Kim  
June 2012

Approved by:

  
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6/6/2012  
Date

## ABSTRACT

The greatest reduction in physical activity participation has been found in young adults. People who have a sedentary life style may experience many negative results, such as anxiety, nervousness and low confidence than those who participate in a physically active lifestyle. Using secondary data approved by Institutional Review Board (IRB), this study examined the effect of the level of physical activity on physical education state anxiety among college students. The participants were 238 students from one comprehensive university located in Southern California. The Godin-Leisure Test Questionnaire (GLTEQ; Godin & Shephard, 1985) and Physical Education State Anxiety Scale (PESAS; Barkoukis, Tsirbatzoudis, Grouios & Rodafinos, 2005) were utilized to measure three levels of physical activity and level of somatic anxiety, cognitive anxiety and worry, respectively. The results indicated that there was a significant difference in somatic anxiety among three different levels of physical activity; the lower physical activity participants showed the higher somatic anxiety level.

## ACKNOWLEDGMENTS

This thesis is most clearly the product of what I have learned during my school years. Also, it would not have been possible without the help of many people.

First of all, I would like to acknowledge my family members whose prayer, love and best wishes were motivation for me to complete this thesis. In addition, I must thank Dr. Hosung So and Dr. Hyun-Kyoung Oh who guided and encouraged me to complete my thesis. During my master's years, their thoughtful guidance played an important role to reach the finish line. I hope to continue my researches in order to contribute physical education field. Finally, the most special thanks goes to my wife HaSun Yoo for her supports and unlimited understanding toward my academic career, and my son DongHa Kim, who are the greatest pleasure and joys in my life.

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CHAPTER ONE  
INTRODUCTION

Background

The U.S Department of Health and Human Services (USDHHS, 1996) has published the guidelines which indicated that regular physical activity provides health benefits. In addition, research indicated that people can benefit from regular physical activity both physiologically and psychologically (Nieman, 2003; Paluska & Schwenk, 2000). For example, physiologically, physical activity helps protect people against chronic disease, such as obesity-related diseases, heart disease, and diabetes (Pender, Murdaugh, & Parsons, 2002). Previous studies suggested that people can take an advantage of resulting positive psychological states in areas, such as reducing anxiety and depression, and promoting positive well-being by participating in regular physical activity (Nieman, 2003; Paluska & Schwenk, 2000). Moreover, there is a social benefit for the individual; physical activity allows people to encourage family and community connectedness, improves social skills and networks, as well as reducing isolation and loneliness (Nieman, 2003; Speed, 2007).

Especially, researchers have shown that there are three important reasons for college students to adopt a proper healthy lifestyle. First, it is clear that college students have been reducing their physical activity time which causes many health-related problems (Gyurcsik, Bray, & Brittain, 2004; Keating, Guan, Castro, & Bridges, 2005; McArthur & Raedeke, 2009). Only 30% to 50% of college students meet the recommended amount of physical activity standards (Keating et al., 2005; Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). Second, Racette and her colleagues (2005) have demonstrated that college students' physical activity and other lifestyle habits are highly correlated with adult behaviors so that maintaining a healthy life in college years is important to their lifestyle in later years. Third, college students' regular physical activity will help them derive the most from college years in terms of determining health knowledge, attitudes, and behaviors (Pearman et al., 1997).

In order for adolescents to live healthy, USDHHS (2008) recommended that they be required to exercise moderately 30 minutes a day in activity, such as fast walking, gentle swimming, or dancing. In addition, adolescents should be involved in vigorous activity as running, jogging, or tennis 20 minutes to 30 minutes at least three days per week.

In addition, the Center for Disease Control and Prevention (CDC, 1997) emphasizes that physical education can help promote lifelong physical activity and encourage high quality of instruction, programs and services which allow students to participate and to enjoy. Therefore, physical education should provide proper opportunity to students regardless of gender (Hastie, 1998), or skill level (Clarke & Quill, 2003). In addition, physical education teachers should consider environments and facilities (i.e., gym, playground, and physical activity tools) as well as enjoyable and effective curriculum in order for adolescents to be encouraged to participate in regular physical activity (National Association for Sports and Physical Education, 2004; USDHHS, 2008).

#### Statement of the Problem

Recent studies have reported that 40 to 50 percent of young adults and college students did not participate in regular physical activity (Keating et al., 2005). A study conducted by Ferrara (2009), for instance, 42% of college students have not been engaged in moderate physical exercising more than 30 minutes most of the daily life, which is the recommended amount of time for adolescents. Furthermore, college students sampled reported that 57% of males and 61%

females do not exercise either vigorously or moderately at all less than three days a week (National College Health Assessment, 2005).

According to the USDHHS (2000), a physically inactive life style indicates an alarming trend toward physical inactivity which may increase the prevalence of some psychological disorders (i.e., anxiety) in the American population. It was also found that depression and anxiety have been found to negatively impact physical function. In addition, research showed that there is a close connection between unhealthy behaviors, such as a physically inactive life and participation in physical activity (Mullens, McCaul, Erickson, & Sandgren, 2004; Rogers, 1983). Furthermore, the USDHHS (1996) pointed out that there appears to be evidence emerging which suggests that students exhibiting a more positive attitudes regarding physical activity in physical education class are more prone to participate in physical activity. Therefore, it was hypothesized that there would be an inverse relationship between the level of physical activity and physical anxiety level, including somatic, cognitive anxiety and worry while college students participate in physical education classes.

### Purpose of the Study

The main purpose of this research was to examine the effect of physical activity on different kinds of anxiety (e.g., somatic, cognitive and worry) in physical education class among college students. The previous literature suggests that anxiety and physical activity is highly connected; also regular physical activity plays a vital role that foster student participating in physical activity and physical education class. Therefore, understanding these relationships can enhance students' physical activity participation and create the positive physical education environment.

### Limitation of the Study

This study was limited by three factors. The first limitation was participants who were recruited from one comprehensive university located in Southern California. Therefore, the result of this study could not be generalized into the different educational settings (i.e., geographic location, size of the university, and/or student population and characteristics). Second, due to the method of data collection using self-report questionnaire, sample size for subsequent

data analysis varied. In addition, data collected were highly assumed to be true and honest responses.

#### Definition of Terms

- A. The Physical Education State Anxiety Scale (PESAS) was developed recently to evaluate physical state anxiety during Physical Education lessons (Barkoukis, Tsirbatzoudis, Grouios & Rodafinos, 2005).
- B. Somatic anxiety is "indications of autonomic arousal and unpleasant feeling states such as nervousness and tension" (Morris, Davis, & Hutchings, 1981, p. 541).
- C. Cognitive anxiety was defined by Morris et al. (1981) as the "negative expectations and cognitive concerns about oneself, the situation at hand, and potential consequences" (p. 541).
- D. State anxiety is "an immediate emotional state that is characterized by apprehension, fear, and tension, and these include acute feelings of apprehension and tension accompanied by physiological arousal" (Spielberger, 1972).
- E. Trait anxiety is a stable characteristic that is formed based on certain personal character. or genetics (Eysenck, 1982).

F. Godin Leisure Time-exercise Questionnaire (GLTEQ) is a self-administered and a self-administered 7-day recall survey designed to assess leisure-time physical activity in an average week (Godin & Shephard, 1985).



## CHAPTER TWO

### REVIEW OF THE LITERATURE

This chapter is a review of the existing literature relevant to anxiety theory, the anxiety and physical activity, and the resource of the state anxiety in physical education class.

#### Anxiety Theory

Spielberger (1972) has been defined the anxiety "as an emotional state consisting of feelings of tension, apprehension, nervousness and worry, and activation or arousal of the autonomic nervous system (p.5)". In the sport psychology field, the anxiety has been one of the most frequent research topics since it is highly connected with sport performance and physical activity (Hardy, Jones, & Gould, 1996; Jones, 1995). Researchers also demonstrated that there is a strong relationship between physical performance and anxiety (Martens, Burton, Vealey, Bump, & Smith, 1990).

#### State and Trait Anxiety

State anxiety implies "the emotional state of anxiety (cognitive and somatic) which stems from typical experiences or prior to competition" (Spielberger, 1966, p.17). The definition

of state anxiety is "an immediate emotional state that is characterized by apprehension, fear, and tension, and these include acute feelings of apprehension and tension accompanied by physiological arousal" (Spielberger, 1966, p.17). The symptoms of increased somatic anxiety may include elevation in heart rate and blood pressure, changes in respiration causing it to be faster, shallower or more intense; the mouth may become dry, pupils may dilate, hair may become erect; and there may be an increase in perspiration (Spielberger, 1972).

Researchers manifested that based on physiological and psychological situations, the level of state anxiety fluctuates differently (Caruso, Dzewaltowski, Gill, & McElroy, 1990).

On the other hand, trait anxiety is more likely to focus on anxiety based on certain personal characteristics or genetics (Eysenck, 1982). Spielbeger (1972) pointed out that trait anxiety tends to vary based on personal aspects or tendency to respond to danger, or a dangerous situation with anxiety state reaction. Pervin (1993) also demonstrated that individual personality includes and represents personal preferences as well as consistent behavior.

In order to measure the level of state and trait anxiety, Spielberger, Gorsuch, and Lushene (1970) developed a model of State Trait Anxiety Inventory (STAI). STAI has been translated

into multiple languages, and widely used as a self-report test. It consists of a twenty-item questionnaire related self-anxiety assessment device separated by state and trait anxiety. It uses four point scales from 1 (not at all) to 4 (very much). 13 of the test items are structured to reveal by higher scores anxiety (e.g., I feel worry). Seven remaining items are negatively loaded and are reverse-scored to reduce effects of acquiescence (e.g., I am excited). Spielberger et al. (1970) reported relatively high test-retest correlations of .54 for state anxiety and .86 for trait anxiety.

#### Difference from Arousal and Stress

Many people interchangeably use the terms arousal, stress, and anxiety. Therefore, it is necessary to distinguish arousal and stress from anxiety.

Arousal can be defined as "a physiological and psychological activation that motivates particular moments in terms of the intensity" (Gould, Greenleaf & Krane, 2002, p.120). The intensity of arousal varies from not at all aroused to completely aroused (Gould et al., 2002).

Stress refers to a complex psychological process that includes three components which are stressors, danger (threat) and emotional reaction (McGrath, 1970). The term stress has a broader meaning than anxiety. Although stress and anxiety can

be differentiated, the response to stress often includes anxiety. A stress process model by McGrath (1970) viewed as a process that has specific effects on a person rather than as a reaction (emotional or physical) to stimulus.

### Anxiety and Physical Activity

A report from the National Institute of Mental Health (NIMH, 1999) showed that anxiety disorder is the one of the epidemic psychological diseases in the U.S. The report mentioned that between ages 18-54, more than 13% of the people were diagnosed with some type of anxiety disorder (NIMH, 1999). Greenberg and Safran (1989) stated the problems of anxiety disorder. These include that people feel fatigued, dizzy, or faint constantly due to lack of defense system; can trigger heart disease (e.g., difficulty breathing, diabetes, and hypertension) and it can cause insomnia.

A substantial amount of study existed on the benefit of exercise in the reduction of anxiety. According to Dunn, Trivedi and O'Neal (2001), regular physical activity plays an important role to diminish and to prevent the level of anxiety and stress for adults as well as college students (American college Health Association, 2010). For example, a study conducted by Broocks, Bandelow, and Pekrun (1998) compared the

level of anxiety between two groups divided by exercise intervention during ten weeks. The results indicated that the group which involved aerobic exercise showed effective reducing the anxiety and panic disorder.

#### Sources of Anxiety in Physical Education

Most of time students seem to be excited to participate in physical education class as it is enjoyable. In addition, Tremayne (1995) stated that physical education class has some potential factors, such as comparativeness, competitions, and evaluations that affect students to perceive some degree of anxiety and stress.

#### Trait Anxiety

Spielberger (1972) indicated that regardless of subject matter, or threatening situations, high trait anxious people are more likely to respond with higher level of anxiety. Furthermore, Tremayne (1995) showed that students' personal low interest, and fear, shame or dislike affects negative participation in physical education. The results of this study collaborated findings that extroverted participants show more motivation toward physical activity (Lochbaum, Bixby, & Wang,

2007) and participate in higher levels of physical activity (Hauesnblas & Giacobbi, 2004).

### Perceptions of Low Competence

Physical activity skills and competence are significant factors for students' anxiety in physical education because the deficiency of skill levels is highly correlated with the students' participation in physical education (Ennis, 1996; Silverman, Kulinna & Crull, 1995). Studies have shown that when students participate in physical education class there are significantly different experiences according to different skill levels (Silverman, 1993; Solmon & Lee, 1996). For example, a study conducted by Hall and Kerr (1998) examined 111 fencers who were asked about anxiety and ability beliefs. The research found that an inverse relationship existed between ability beliefs and anxiety; fencers who had the lower fencing skills showed higher anxiety in their performance. In short, according to Hater's (1978) competence theory, the individual's high perception of ability is highly linked to physical activity participation.

### Peer Pressure

Reproductive Health Outlook (2005) has indicated peer pressure as an emotional or mental force from people belonging to the same social group. This includes subjects in terms of a

relatively similar variance, such as same age, grade, or status. According to Wentzel (1991), peer groups play a vital role that affects their subculture in areas as language, clothes, and behaviors. Especially, Harter (1999) demonstrated that adolescents are obsessed with how they are viewed by friends or peer group. Given that, some evidence demonstrated that adolescents are associated with peer influence when it comes to academic achievement (Oswald & Suss, 1988), as well as constantly responding to the social context in schools and in physical education classes (Carlson & Hastie, 1997).

In fact, peer influences are constantly acting upon students' behaviors, either creating a positive energy or triggering negative feeling, such as anxiety and stress through verbal or physical intimidation (Ennis, 1996b). According to Burns and Darling (2002), the most common way adolescents are affected by peers is self-conscious worrying about the future reactions of others.

### Evaluation

In school, proper testing and evaluation are critical components in order to motivate and improve teaching and learning (Eble, 1976). However, Ames (1992) researched that the test procedures evoke the feelings of anxiousness and worthlessness, as well as stress and physiological hyper-

arousal which prevent students from completely benefiting from the learning process (Mueller, Aicinena, Corso, & Phillips, 1988). According to Tsang (2007), students tend to show high levels of anxiety in physical education class when they perceive the pressure of evaluation and assessments.

### Physical Education Teachers

According to Aicinena (1991), physical education teachers' roles are important because their competence will affect not only improvement of the quality of physical education class, but will also influence students' attitudes toward physical education. In order to enhance learning environments, developing teacher's ability and organization skill is necessary (Emmer, Evertson & Anderson, 1980; Evertson & Emmer, 1982).

The National Association for Sports and Physical Education (NASPE, 2009) summarized improper physical education teachers' behavior which impacts on negative students' participation on physical education class. For example, they make students do exercise such as push-ups or running because of losing the game or poor performance. The second issue is the use of physical exercise as a punishment (e.g., California, Massachusetts, and Hawaii). In fact, in the U.S, 29 states established that physical punishment is illegal (Dupper & Dingus, 2008).



Furthermore, NASPE (2004) indicated the responsibilities of physical education teachers, such as (a) providing age-appropriate programs, (b) giving students choices of activities, and (c) satisfying student needs. When it happens that the physical education teacher does not to provide those things appropriately, students will develop negative attitudes toward physical education.

## CHAPTER THREE

### METHODOLOGY

The purpose of this research was to examine the effect of physical activity on different kinds of anxiety (e.g., somatic, cognitive and worry) in physical education class among college students.

#### Participants

All participants were randomly recruited from one comprehensive university located in Southern region of California. A total of 238 students were also randomly selected from general Kinesiology classes (e.g., self-defense, volleyball, weight training and badminton, foundation for life fitness-lecture based class).

#### Instruments

Participants were given a set of the instruments. The instruments were composed of three sections, including (a) demographic questions, (b) Physical Education State Anxiety Scale (PESAS), and (c) Godin Leisure Time-Exercise Questionnaire (GLTEQ). A complete copy of the instruments is included in Appendix A.

Table 1. Contents and Items for the Instruments

	Contents	Items
<b>Demographics</b>	Age, Major, Year in college, GPA, Height, Weight, Ethnicity	7
<b>PESAS</b>	Somatic, Worry, Cognitive	18
<b>GLTEQ</b>	High, Moderate, Light	4
	<b>Total</b>	<b>29</b>

Along with demographic items, two questionnaires were used to obtain the data necessary for this study. The first questionnaire was the Physical Education State Anxiety Scale (PESAS) developed by Barkoukis et al. (2005), designed for measuring state anxiety in physical education class. It consists of 18 questions, measuring (a) somatic anxiety (e.g., I feel as though I am short of breath), (b) cognitive anxiety (e.g., I find it difficult to focus on the PE task presented) and (c) worry anxiety (e.g., I think about the consequences of possible mistakes in the test).

According to Barkoukis et al. (2005), PESAS can be a useful measurement for predicting in physical education lesson in regard to cognitive, affective, and behavioral elements. The validity and reliability of the original version of PESAS in Greek has been accepted having a sound measurement construct

(i.e., CFI = .92; RMSEA = .06) and scale (i.e., Cronbach's alphas ranging between .79 and .83).

The second questionnaire was Godin Leisure-Time Exercise Questionnaire (GLTEQ), commonly used to assess the individual's present stage of exercise behavior (Godin & Shephard, 1985). GLTEQ is an effective measurement because there are only four self-reported questions based on recall self-report in a typical week in terms of physical activity time (e.g., how many times per week) and the intensity (e.g., low, moderate and high).

The GLTES (Godin Leisure Time-Exercise Scale) can be calculated by  $(9 \times \text{Strenuous}) + (5 \times \text{Moderate}) + (3 \times \text{Light})$ . Based on the GLTES, three levels of physical activity were categorized. The three categorized groups were analyzed as low, moderate, and high activity levels. To investigate effects of levels of physical activity, the participants were then proportionally assigned to one of the three groups. First, the low activity group was from 0 to 33.3 percentile from the entire participants. Second, the moderate group was from 33.4 to 66.7 percentile. Last, the high activity level was from 66.8 to 100 percentile (see Table 2).

In addition, numerous studies have been conducted the GLTEQ test-retest reliability and reported the reliability

coefficient of .74 (Godin & Shephard, 1985; Sallis, Buono, Roby, Micale & Nelson, 1993; Jacob, Ainsworth, Hartman & Leon, 1993). The GLTEQ has been considered one of the reliable and valid measurements to measure levels of physical activity (Pereira et al., 1997).

### Data Collection and Analysis

The secondary data set that was collected in May 2011 by two reviewers for this project and approved by Institutional Review Board (IRB) from the university (i.e., IRB approval #10080) was used for this project.

To collect the data, the questionnaires were administered to students who were enrolled in several Kinesiology classes. Participants were instructed to read the instructions carefully and check the appropriate responses. Each student took around 30 minutes to respond the questionnaire which included PESAS and GLTEQ, and all data were self-reported.

In this study, Statistical Package for Social Science (SPSS) version 19 was used to analyze all descriptive statistics. Furthermore, ANOVAs were utilized to compare whether there were any differences on PESAS by GLTES levels, and Duncun was used as the post hoc comparison test. The independent variables were

GLTES levels of low, moderate and high. The dependent variables were PESAS scale which are somatic, cognitive and worry.

### Hypotheses

The primary purpose of this study was to examine the relationship between the levels of physical activity and physical education anxiety scale (somatic, cognitive and worry). The hypotheses to be tested were significant differences in subscales of PESAS among the levels of physical activity (low, moderate and high).

CHAPTER FOUR  
RESULTS AND DISCUSSION

Results

As seen in Table 2, 238 college students (99 males, 139 females) were analyzed for this study, between ages of 19 and 51 ( $M = 23.14$ ,  $SD = 5.09$ ) years. Participants were primarily Hispanic ( $n = 109$ , 47.0%) and White Non-Hispanic ( $n = 87$ , 37.5%), and rest of ethnic groups are Black Non-Hispanic ( $n = 23$ , 9.9%), and Asian/Pacific Islander ( $n = 13$ , 5.6%).

Table 3 illustrates findings of GLTES that male ( $M = 56.23$ ,  $SD = 26.70$ ) showed higher mean score than female ( $M = 46.72$ ,  $SD = 24.38$ ), and Kinesiology major students ( $M = 56.67$ ,  $SD = 24.85$ ) showed higher mean score than non-Kinesiology major students from business, science and business ( $M = 41.97$ ,  $SD = 24.62$ ). Furthermore, in terms of years in school, the upper level students, junior ( $M = 59.75$ ,  $SD = 26.40$ ) and senior ( $M = 48.92$ ,  $SD = 23.57$ ) showed higher mean score than lower level students, sophomore ( $M = 45.84$ ,  $SD = 24.79$ ) and freshmen ( $M = 45.79$ ,  $SD = 27.96$ ).

Table 2. Descriptive Analysis

	Gender		Total
	Male n=99 (41.8%)	Female n=139 (58.2%)	n=238, (100.0%)
	M (SD)	M (SD)	M (SD)
Demographics			
Age in Year	23.7±5.64	22.8±4.64	23.14±5.09
<u>Major</u>			
Kinesiology	52 (52.5%)	62 (44.6%)	114 (47.9%)
Non-Kinesiology	47 (47.5%)	77 (55.4%)	124 (52.1%)
<u>Year of College</u>			
Freshmen	15 (15.6%)	23 (16.8%)	38 (16.0%)
Sophomore	14 (14.6%)	23 (16.8%)	37 (15.6%)
Junior	24 (25.0%)	41 (29.9%)	65 (27.4%)
Senior	43 (44.8%)	50 (36.5%)	93 (41.0%)
GPA	2.91±.38	3.00±.41	2.97±.40
Height (m)	1.78±.08	1.63±.07	1.69±.10
Weight (kg)	88.11±18.17	66.12±14.74	75.27±19.52
BMI (kg/m <sup>2</sup> )	27±5.90	24.82±5.42	25.97±5.71
<u>Ethnicity</u>			
White	34 (35.1%)	53 (39.3%)	87 (37.5%)
Hispanic	50 (51.5%)	59 (43.7%)	109 (47.0%)
Black	11 (11.3%)	12 (8.9%)	23 (9.9%)
Asian/Pacific Islander	2 (2.1%)	11 (8.1%)	13 (5.6%)
<u>GLTES</u>			
Low	23 (23.2%)	56 (40.3%)	79 (33.3%)
Moderate	32 (32.3%)	48 (34.5%)	80 (33.3%)
High	44 (44.5%)	35 (25.2%)	79 (33.3%)

M=mean; SD=standard deviation; GPA=grade point average; BMI=body mass index.



Table 3. Godin Leisure Time-Exercise Scale of the 238 Participants

Category	N(%)	GLTES	
		M	SD
Male	99 (41.8%)	56.23	26.70
Female	139 (58.2%)	46.72	24.38
Freshman	38 (16.0%)	45.79	27.96
Sophomore	37 (15.6%)	45.84	24.79
Junior	65 (27.4%)	59.75	26.40
Senior	93 (46.4%)	48.92	23.57
White	87 (37.5%)	54.53	26.44
Hispanic	109 (47.0%)	49.13	24.48
Black	23 (9.9%)	49.40	25.78
Asian/Pacific	13 (5.6%)	40.15	18.40
Kinesiology	114 (47.9%)	56.67	24.85
Non-Kinesiology	124 (52.1%)	41.97	24.62

GLTES = Godin Leisure Time-Exercise Scale

Lastly, ethnic differences were also found that white people (M = 54.53, SD = 26.44) showed the highest mean score, and were followed Hispanic (M = 49.40, SD = 25.78) and Black (M = 49.13, SD = 24.48), and Asian (M = 40.15, SD = 18.40).

Table 4 shows a series of one-way ANOVA to determine if there were any significant differences between the three physical activity levels in PESAS. Significant between-group differences were found in somatic anxiety.

Table 4. Results of One-way ANOVAs for Differences on the Levels of Physical Activity

<b>GLTES</b>					
<b>Factors</b>	I	II	III	<b>F</b>	<b>Duncun</b>
	(Low)	(Moderate)	(High)		
	M ± SD	M ± SD	M ± SD		
<b>Somatic</b>	9.41 ± 4.29	8.92 ± 3.82	7.83 ± 3.40	<b>3.45*</b>	I>III
<b>Cognitive</b>	10.50 ± 4.49	9.73 ± 4.21	9.60 ± 4.55	.94	
<b>Worry</b>	13.35 ± 5.98	11.43 ± 4.93	11.96 ± 5.96	2.42	

\*  $p < .05$

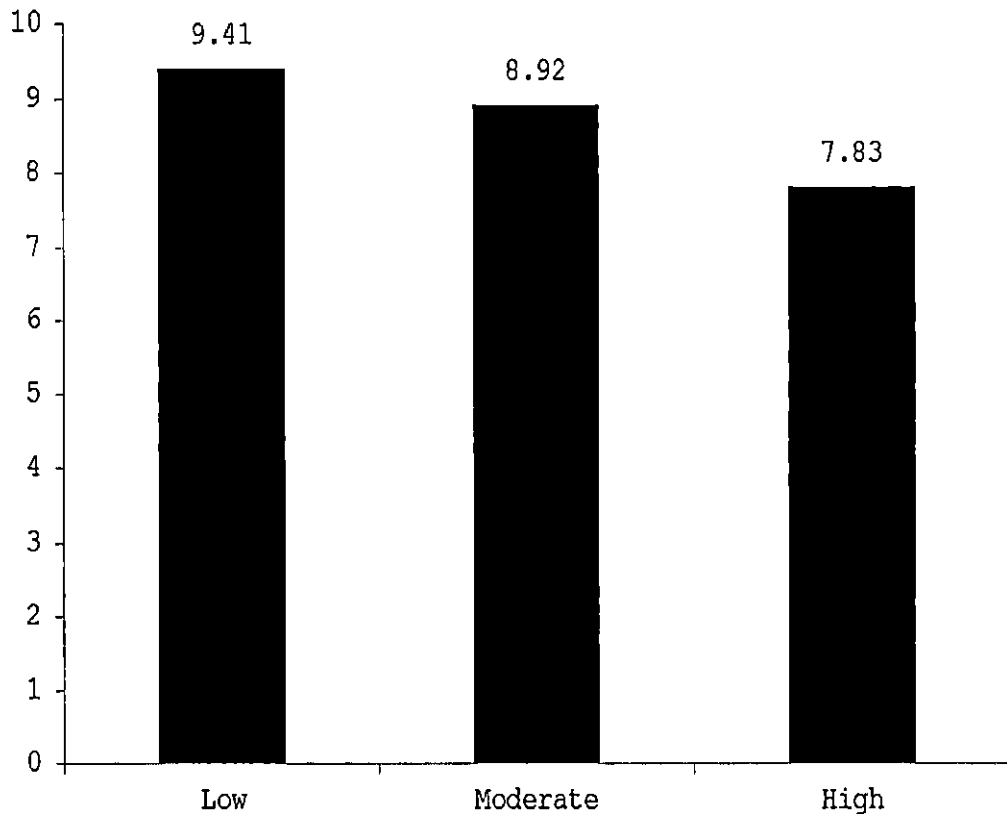


Figure 1. Differences in Somatic Anxiety by Three Physical Activity Levels

#### Discussions

The main purpose of this research was to examine the effect of physical activity on different types of anxiety (somatic, cognitive, and worry) in physical education class among college students. This research found that there was a significant difference in somatic anxiety among three different physical levels of physical activity; lower physical activity

participants had a higher somatic anxiety when they engaged in physical education class.

It was understood that people who regularly participate in physical activity develop a more positive opinion of the benefits of physical activity. Silverman and Subramaniam (1999) found that participants with positive beliefs in general have a favorable attitude toward physical activity, and on the contrary, if participants have negative attitude they sustain an unfavorable attitude toward physical activity, resulting in anxiety and stress.

Somatic anxiety is related to the physiological state of anxiety and is caused directly by stimulation or arousal of the autonomic nervous system. In other words, somatic anxiety is the component that reflects the perceptions of the psychological stress to the physiological response. When the brain perceives a potentially stressful or anxiety producing situation, it sends messages of alarm through nerves and hormones to alert the body to respond to the "fight or flight" response.

More specifically, Anisman, Zaharia, Meaney and Merali (1998) conducted a detailed study of physiological body reactions. The hypothalamus (HPA) is in charge of the autonomic nerve system (ANS) which controls the heart, lungs, stomach,

blood vessels and glands. An important point is that anxiety and stress tend to prevent the parasympathetic system from working properly, which forces the body to take extra actions. Those result in increased heart rate, blood pressure, perspiration, muscle tension and cell metabolism. Therefore, it is thought that somatic anxiety is experienced to greater degree by people who do not participate in regular physical activity.

In addition, previous studies pointed out that highly active people had better motor skills than inactive people (Graf et al., 2004; Oja & Jurimae, 1998). Indeed, physical fitness and motor competence are highly correlated with physical activity participation (Graf et al., 2004; Okely, Booth & Patterson, 2001). Furthermore, Hardy and Parfitt (1991) concluded that there was an inverse relationship between somatic anxiety and performance, which means that when somatic anxiety is high the performance is worse. Therefore, students' interests and desire to develop skills can be stimulated by regular physical activity (Portman, 1995). This promotes successful student participation in regular physical activity and physical education class.

In fact, there are many factors, including personal characteristics, physical environment and social behaviors

which influence levels of physical activity and physical education participation (Silverman & Subramaniam, 1999). Furthermore, numerous factors can help or hinder regular participation in physical activity. Graf et al. (2004) showed that the individual's consistent exercise history, opportunity to be physically active and higher motor skill competency are related to positive physical activity levels. On the other hand, people might fail to participate in physical activity when they have a negative attitude toward sports, lack of physical activity experience, problems with peers, coaches, or teachers (Seefeldt, Ewing, & Walk, 1992). Especially, adolescents' yearly participation in physical activity represents the most important intervention period to reinforce of life-long activity patterns. Adolescents who are inspired by sports participation could be more likely to become involved in physical activity as adults (Taylor, Blair, Cummings, Wun, & Malina, 1999).

To summarize this study, multiple factors contribute to participation in physical activity. Physically active participants are more likely to have motor competence and greater physical fitness conducive to a higher degree of comfort and confidence (i.e., especially less somatic anxiety) when they take part in physical activity.

## CHAPTER FIVE

### CONCLUSION

Adolescents are considered to be in a critical developmental period which may affect their behavior throughout their adult lives (Erickson, 1968; Marcia, 1994). To promote a healthy lifestyle, it is necessary to facilitate appropriate physical activity. Previous studies have pointed out that regular physical activity enhances an individual's quality of life, not only to improve physiological health and prevent numerous diseases, but also, to help individuals promote psychological stability and develop self-esteem and self-concept.

The NASPE Standard 6 indicates that physically activity encourages health, enjoyment, challenge, self-expression and social interaction in the physically educated child. Furthermore, more time for physical activity helps boost students' sports skills and performances which empower them to engage in physical activity more frequently.

The result of this study also indicated that an inverse relationship existed between individual physical participation and anxiety, in particular somatic anxiety which was found among students who participate in lower physical activity.

Most of parts, physical education class is a primary venue for educating individuals in the adoption of a physically active lifestyle. Therefore, in order to support students' participation in physical activity, it is necessary for physical educators to develop better educational environments, such as a caring learning environment (Ennis, 1999) and modifying sports activities (Castelli & Rink, 2003) based on specific needs.

In addition, the learning environment for physical education class should be enjoyable. At the same time, it should embody a solid learning process and should be meaningful to all individuals. Lastly, active participation and meaningful engagement can help adolescents prepare for being healthy and participating in lifelong physical activities.



APPENDIX A  
SURVEY INSTRUMENTS

# PSDQ<sup>®</sup> GLTES SPAS-7 CSAI-2 PESAS

1. STUDENT IDENTIFICATION NUMBER (LAST FOUR DIGITS) .....

2. GENDER .....  Male  Female

3. AGE (YEARS) .....

4. MAJOR ..... Department of

5. WHAT YEAR OF COLLEGE ARE YOU IN: Circle one ..... Freshmen Sophomore Junior Senior Graduate

6. OVERALL GPA (Grade Point Average): For example: 3.25 .....

7. HEIGHT IN FT. & INCHES (in) .....

8. WEIGHT IN POUND (lb) .....

9. ETHNIC BACKGROUND: Please Check One

American Indian/Alaskan Native  White Non-Hispanic  Black Non-Hispanic  Hispanic  Asian / Pacific Islander

## During a typical 7-day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time?

	TIMES PER WEEK					
10. STRENUOUS EXERCISE (Heart Beats Rapidly) <i>For example, running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling.</i>	1	2	3	4	5	6
11. MODERATE EXERCISE (Not Exhausting) <i>For example, fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, a pine skiing, poplar and folk dancing.</i>	1	2	3	4	5	6
12. MILD EXERCISE (Minimal Effort) <i>For example, yoga, archery, fishing from river bank, bowling, horseshoes, golf, snowmobiling, easy walking.</i>	1	2	3	4	5	6
13. During a typical 7-day period (a week), in your leisure time, how often do you engage in any regular activity long enough to work up a sweat (Heart beats rapidly)? - Please mark one <input checked="" type="checkbox"/>	OFTEN	<input type="checkbox"/>	SOMETIMES	<input type="checkbox"/>	NEVER/RAR	<input type="checkbox"/>

**PLEASE DO NOT LEAVE ANY STATEMENTS BLANK, IF UNSURE, PLEASE ASK FOR HELP!**

PLEASE READ EACH STATEMENT; THEN CIRCLE THE APPROPRIATE NUMBER TO THE RIGHT OF THE STATEMENT TO INDICATE "HOW YOU FEEL RIGHT NOW PRIOR TO THE EXECUTION OF PHYSICAL EDUCATION TASKS".		Not at all	Somewhat	Moderately So	Fairly	Very Much
1.	I find it difficult to remember information about the tasks presented	1	2	3	4	5
2.	I feel as though I am short of breath	1	2	3	4	5
3.	I am concerned about making errors during task execution	1	2	3	4	5
4.	I find it difficult to focus on the PE task presented	1	2	3	4	5
5.	I feel discomfort when I breathe	1	2	3	4	5
6.	When performing the tasks, I feel uneasy about potential mistakes	1	2	3	4	5
7.	I find it difficult to memorize information regarding the tasks presented	1	2	3	4	5
8.	I feel dizzy	1	2	3	4	5
9.	I worry a lot about the physical tests	1	2	3	4	5
10.	I find it difficult to remember PE tasks I already know	1	2	3	4	5
11.	I sense a feeling of pressure on my chest	1	2	3	4	5
12.	I am concerned about falling when performing the tasks	1	2	3	4	5
13.	Irrelevant thoughts disturb my thinking	1	2	3	4	5
14.	My body is aching	1	2	3	4	5
15.	I think about the consequences of possible mistakes in the test	1	2	3	4	5
16.	I have difficulty understanding the pattern of such complex tasks	1	2	3	4	5
17.	I feel as if something is choking me	1	2	3	4	5
18.	I worry that I will perform badly	1	2	3	4	5

**GLTEQ**

Godin G., & Shephard R.J. (1985). A simple method to assess exercise behavior in the community. *Can J Apple Sport Sci.*10, 141-146.

**PESAS**

Barkoukis, V., Tsirbatzoudis, Grouios, G., & Rodafinos, A. (2005). The development of a physical education state anxiety scale: A preliminary study. *Perceptual & Motor Skills*, 100, 118-28.

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